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Memorandum

TO: Planning and Operations Committee DATE: January 3, 2003

FR: Executive Director W.I.: 1121

RE: 2002 High Occupancy Vehicle (HOV) Master Plan Update

MTC, in cooperation with Caltrans, Congestions Management Agencies (CMAs) and the region's transit operators, is preparing a 2002 HOV Master Plan update. A draft plan will be released for agency and public review this month. Staff will provide an update of the plan's status and preliminary recommendations at your January 2003 meeting, and request Commission adoption in February 2003.

Study Background

Bay Area HOV lane planning has been guided by MTC's HOV Master Plan. MTC's first master plan was adopted in April 1990. The 1990 plan was updated by MTC's 1*997 HOV Lane Master Plan Update for the San Francisco Bay Area* (November 1997).

MTC has completed a number of related HOV lane evaluations since the adoption of the 1997 HOV Lane Master Plan Update. These include the completion of the *2000 Blueprint for the 21st Century* and the *Bay Area Rapid Bus Proposal* (March 2000), which recommended an extensive express bus system operating on an expanded HOV lane system. Much of this work was recently updated by the 2001 Regional Transportation Plan (RTP).

The recently adopted 2001 Bay Area Ozone Attainment Plan committed to an update of the 1997 HOV Lane Master Plan as a "further study measure" to assess key operational and air quality issues, and develop recommendations on how the Bay Area's HOV lane system should expand and operate; initial work on the HOV emissions analysis was reviewed with this committee at its December 2002 meeting.

Key Features of 2002 HOV Master Plan Update

The 2002 HOV Lane Master Plan includes a review of current and future HOV lane performance based on an assessment of HOV lane forecasts from the latest modeling conducted for the 2001 RTP. Improvements that support further development of MTC's Regional Express Bus Program provide the basis for identification of additional HOV lane facilities beyond those included in the 2001 RTP.

Other areas evaluated as part of the plan update include:

- A vehicle license plate user survey and web survey to evaluate carpooler and non-carpooler characteristics and attitudes about the region's HOV lane system
- Potential for spot use of some freeway shoulders to fill critical gaps in the HOV lane system
- Potential for additional HOV freeway-to-freeway connectors
- Potential for additional park-and-ride lots and freeway transit stops to support expanded express bus service
- Improved HOV lane enforcement
- A review of past and ongoing Bay Area congestion pricing studies and their potential application to the HOV lane system
- Update costs of recommended HOV and HOV support facilities (e.g. park and ride, bus stops/shelters, etc.)

A Technical Advisory Committee (TAC), consisting of staff and individuals representing a wide range of interests, including MTC, Caltrans, California Highway Patrol (CHP), Bay Area Air Quality Management District, RIDES, County Congestion Management Agencies and transit operators provided study oversight.

Key Preliminary Findings and Recommendations

MTC committed to evaluate several aspects of the region's HOV and express bus systems as part of Further Study Measure 2 included in the adopted 2001 Ozone Plan. A brief summary of preliminary findings and recommendations is as follows:

- What does the public think of HOV lanes? – According to recently conducted license plate and web surveys recently conducted by MTC, Bay Area HOV lanes are supported by carpoolers and non-carpoolers alike.
- How well are HOV lanes used now and in the future? - Nearly all current peak direction HOV lanes meet established Caltrans performance standards. Fewer off-peak direction HOV lanes meet standards currently, but nearly all will by 2010 or 2025. Staff recommends HOV lanes continue to be monitored for possible adjustments to the hours of operation, especially in the off-peak direction.
- How significant are HOV lane violation rates and how can CHP enforcement be improved? – Most HOV lanes have observed violation rates within acceptable Caltrans standards (below 10%), with the notable exception being the region's most heavily used HOV facility: I-80 westbound to San Francisco. The generally low violation rate is due to the generally high HOV lane use and an aggressive CHP enforcement program. HOV lane enforcement funding will need to increase as the region's HOV lane system continues to grow. In addition, the feasibility of video surveillance to supplement CHP enforcement should be explored.
- Should HOV occupancy requirements be increased from two or more (2+) to 3+ in the most congested corridors? - MTC projections indicate that most 2+ HOV lanes will need to be increased to 3+ between 2010 and 2025 in order to keep lanes from being congested and preserve HOV travel time savings.

- Should HOV lanes be converted to bus-only lanes? – MTC projections indicate that there is not sufficient demand to warrant conversion to bus-only lanes. In addition, such conversions would force carpool and vanpool vehicles into already crowded mixed flow lanes.
- Should freeway shoulders be used for peak-period bus use? – The evaluation indicates that there would be only very limited available continuous shoulder width available on Bay Area freeways to accommodate bus use.
- How feasible would it be to allow non-carpools (drive alones or commercial vehicles) to use HOV lanes by paying a toll (know as High Occupancy Toll, or HOT lanes)? – Most Bay Area HOV lanes are well used now and do not have sufficient capacity to "sell". Implementing HOT lanes may be a strategy to consider in some corridors when future demand necessitates converting from 2+ to 3+ HOV lanes.
- How much will it cost to implement the HOV Master Plan? – The plan is estimated to cost about $3.7 billion to complete, however funding for more than half of the recommended improvements is already committed ($1.2 billion in the TIP and another $770 million in the later years of the 2001 RTP).

Detailed Results

Surveys

- Two surveys were conducted as part of the plan update: 1) License plate survey of carpool lane users – 5600 surveys sent/1,300 surveys returned; and 2) Web survey for carpool and non-carpool lane users – about 4,700 responses (as of December 31, 2002) – survey will remain posted until January 6, 2003)
- Respondents Support HOV lanes: 60% of those responding to the web survey supported Bay Area HOV lanes; 85% of those responding who indicated regular (2-3 times or more per week) HOV lane use supported HOV lanes, compared to almost 50% of non-carpoolers (less than once a week) who responded that also support HOV lanes
- General satisfaction with HOV lane use among carpoolers: 61% of web survey respondents think HOV lanes are not well used; 68% of regular carpoolers responding think HOV lanes are well used, while 73% of the non-users responding tend to think HOV lanes are under used
- Most carpool with family members or co-workers: 75% of surveyed carpool drivers commute with family members or co-workers; 18% of those surveyed drove with "casual" carpoolers.
- Most carpoolers think that HOV lanes provide substantial travel time savings: 72% from the carpool lane user survey indicated that HOV lanes "greatly reduces" commute travel time.
- Most think that HOV lane enforcement needs to be increased: 51% of the web survey respondents thought that enforcement was not adequate.

Review of Current and Forecasted Use of Existing HOV Lanes

- The region's HOV lane system has grown significantly over the past 12 years: 64 lane miles in 1990, to 270 lane miles in 1997, to 362 lane miles in 2002

- Most freeway HOV lanes are currently performing reasonably well: Caltrans' performance measures indicate that HOV lanes should carry at least 800 vehicles/peak hour; 1,800 persons/peak hour and save users about 1 minute/mile. Nearly all current peak direction HOV lanes meet the standards. The notable exception is Contra Costa SR 4 HOV lanes; these lanes are performing below the standards, but have only been open for a little over a year and require more time to generate additional use.

  Some off-peak direction HOV lanes are performing below the standards. Most all of these off-peak direction facilities are forecast to exceed the standards between 2010 and 2025, and therefore we recommend that the HOV designation remain; Caltrans, CHP and MTC will continue to monitor these facilities to determine if the hours of operation warrant further adjustment.

- Between 2010 and 2025 most HOV lanes will likely need to have occupancy requirements increased: Projected 2025 HOV lane volumes will create unacceptable levels of service on most HOV lanes assuming current occupancy requirements. It is likely that the occupancy requirements for several of these facilities will need to be increased in order to maintain acceptable time savings for HOV lane users, however 79% of those responding to the web survey think carpool lanes should be for two or more (2+) occupants.
- HOV lane hours of operation will need to increase as the peak commute period expands: The Bay Area should consider moving toward a consistent set of hours of operation. This may correspond to the current maximum of 5:00 a.m. to 10:00 a.m. and 3:00 p.m. to 7:00 p.m. (67% of those responding to the web survey opposed expanding HOV lane hours; 50% of regular carpoolers opposed expanding hours, while 77% of non-carpoolers opposed expanding HOV lane hours)

Recommended HOV Lane and Support Facility Improvements

The recommended HOV lane and support facility recommendations build off the 2001 RTP. The region's 2003 Transportation Improvement Program (TIP) will fund about 72 new HOV lane miles. The 2001 RTP adds an additional 144 new HOV lane miles to the 2003 TIP-funded HOV lane system, bringing total HOV lane miles in the year 2025 to 578 (60% increase over the current HOV lane system).

The 2002 HOV Lane Master Plan recommendations beyond the 2001 RTP are identified in two groups: Blueprint Priority 1 and Blueprint Priority 2. Those in Priority 1 are recommended for consideration in the 2004 RTP update, while those in Priority 2 are recommended for consideration in a future RTP only if new funding sources beyond those typically identified in the RTP are available.

Five types of Blueprint improvements have been identified (see attached map):

1) New HOV lanes – these represent gap-closures or extensions to existing or planned HOV lanes
2) Freeway-to-Freeway HOV Connections

3) Direct HOV lane access ramps at freeway interchanges
4) Major In-Line Freeway Express Bus Stations –bus stops in the freeway median and park-and-ride lots adjacent to freeway interchanges
5) Minor Freeway Express Bus Stations – Smaller park-and-ride lots with bus bays adjacent to the freeway with HOV bypass at on- and off-ramps

Recommended Priority 1 improvements include:

- 83 new HOV lane miles
- 1 new freeway-to-freeway HOV connections
- 2 new direct access ramp locations and 2 expansion locations
- 3 new major freeway median express bus stations
- 14 new minor freeway express bus stations

Recommended Priority 2 improvements include an additional:

- 88 new HOV lane miles
- 3 new freeway-to-freeway HOV connections
- 4 new direct access ramp locations and 2 expansion locations
- 3 new major freeway median express bus stations
- 3 new minor freeway express bus stations

Recommended Regional Express Bus System

The plan assessed MTC's 2000 Blueprint Bay Area Rapid Bus Proposal and other transit operator plans, to identify a regional express bus system that would directly benefit from the HOV lane/support facilities system identified above. The HOV Master Plan makes the following preliminary recommendations:

- Express bus service be expanded in the following markets or streams (see attached map):
  - Sonoma to Downtown San Francisco
  - Marin County to Berkeley to Tri-Valley
  - Solano/Napa Counties to Downtown San Francisco
  - Solano/Contra Costa Counties to Santa Clara County
  - Tri-Valley to San Mateo County
  - East Contra Costa County to Santa Clara County
  - Southern Santa Clara County to San Francisco
- Priority corridors within those streams are as follows:
  - I 80 (Alameda, Contra Costa and Solano Counties)
  - I-580 (Alameda County)
  - I-680 (Alameda, Contra Costa and Santa Clara Counties)
  - US 101 (Marin, San Mateo and Sonoma Counties)
  - SRs 84/92 (Alameda and San Mateo Counties)
  - SR 85 (Santa Clara County)
- Projections indicate that even with expanded bus service there likely would not be sufficient demand to justify converting some HOV lanes to "bus only" lanes and/or designation of any new carpool lanes as "bus only" lanes (this concept was not supported in the HOV web survey - 86% opposed).

- There appears to be limited potential for use of freeway shoulders for interim express bus or carpool use to close critical gaps in the HOV lane system until new lanes can be constructed; this concept will be analyzed in more detail prior to plan adoption (the web survey produced mixed results on this topic – about 40% opposed, while another 40% supported and the remaining neutral or undecided).
- Taking mixed flow lanes for HOV lane use is not recommended. Current and projected congestion does not make this a viable option (this concept was not supported in the HOV web survey - 67% opposed).

Congestion Pricing Options

Past Bay Area studies have explored whether single occupant vehicles (SOVs) and small commercial vehicles should be allowed to "buy in" to under-used existing HOV lanes or planned HOV lanes. This so called High Occupancy Toll (HOT) lane concept has been operating fairly successfully in Southern California on SR 91 in Orange County and I-15 in San Diego County.

The HOV Master Plan update reviewed past Bay Area congestion pricing studies and is assessing under what circumstances, if any, pricing of HOV facilities could be pursued in various Bay Area corridors. Preliminary findings and recommendations include:

- Projections indicate that at current occupancy levels there will be little available peak direction HOV capacity available to "sell" in the future.
- Occupancy requirements on many Bay Area HOV lanes will therefore need to be raised due to accommodate projected increased HOV volumes; consider implementing HOT lanes in those corridors if there is excess capacity to sell (this concept has been implemented on I-10 in Houston where 2+ carpools pay during designated HOV lane hours, while 3+ carpools travel free).
- The Alameda County CMA is nearing completion of a HOT lane feasibility study on I-680 HOV lanes between SR 84 and SR 237 (Alameda County's recently reauthorized transportation sale tax measure stipulated that these lanes be operated as HOT lanes unless found infeasible to do so); staff will continue to monitor this study.
- Continue to allow free passage on Bay Area toll bridges for designated carpools during designated hours (71% support from HOV web survey).
- Variable tolls on toll bridges have been generally supported in previous polls (63% support in last Bay Crossing Study poll); variable pricing should be considered as part of any future toll increase proposal.

Enforcement

Successful operation of an HOV lane system depends on a high level of compliance with the regulations that govern HOV lane use. Bay Area HOV lanes have restrictions that limit access by vehicle occupancy and certain other exempt vehicles (e.g. motorcycles, two-seat vehicles and alternative fuel vehicles). Bay Area freeway and expressway HOV lane compliance is enforced by the California Highway Patrol (CHP).

The plan conducted an assessment of HOV lane violation rates and enforcement efforts and makes the following preliminary findings and recommendations:

- Most HOV lanes have relatively low Caltrans observed violation rates: although there are no set standards, a less than 10% observed violation rate is considered by Caltrans to be reasonable. All but three HOV lanes (I-80 westbound A.M.; I-80 HOV flyover in the A.M.; and I-880 HOV ramp @ 16th Street) are lower than the 10% threshold.
- Consistent and regular funding of HOV lane enforcement should be provided.
- Any HOV lane construction should provide space for median HOV enforcement.
- Explore the feasibility of video surveillance to supplement CHP enforcement.

Funding/Costs
The cost to implement the 2002 HOV Lane Master Plan recommendations is estimated to cost $3.7 billion (2002 dollars). The cost breakdown is as follows:

- 2003 TIP (currently programmed): $ 1.2 billion
- 2001 RTP (Track 1): $770 million
- Blueprint Priority 1: $760 million
- Blueprint Priority 2: $1 billion
- Express Bus: $40 - $50 million capital; $15 - $25 million operating

It is important to point out that more than half of the funding to implement the HOV Master Plan is already committed, with $1.2 billion funded in the 2003 TIP and $770 million committed in later years of the 2001 RTP.

Next Steps

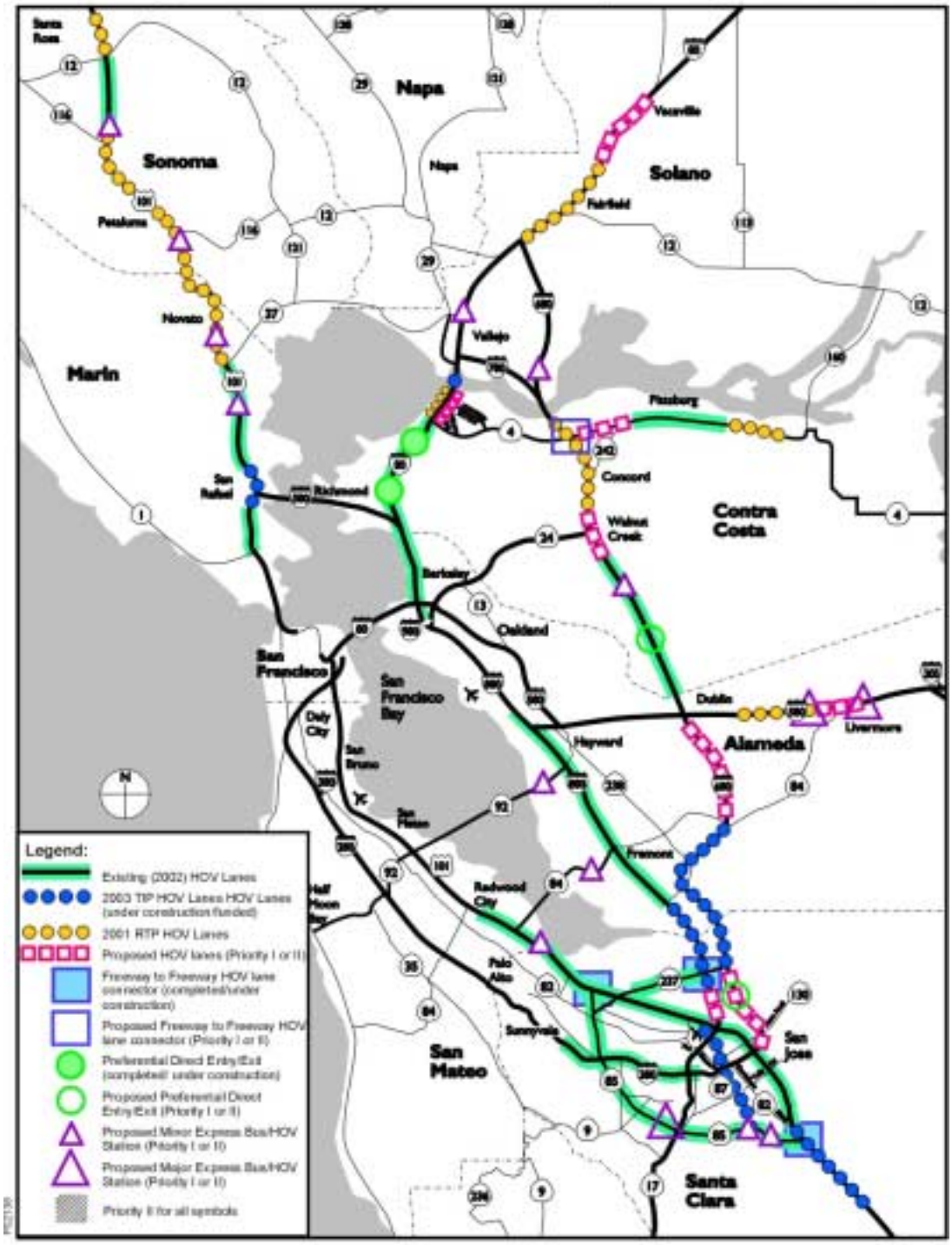
A draft 2002 HOV Lane Master Plan will be released later this month. The draft plan will be reviewed by the TAC and will be posted on MTC's web page to solicit public comment on proposed improvements. Comments will be incorporated into the final plan that will brought to the Commission in February 2003.

The consultant is still working on finalizing recommendations on HOV facilities and specific express bus services; cost estimates for these elements will also be reviewed with the TAC and be included in the final plan.

Steve Heminger

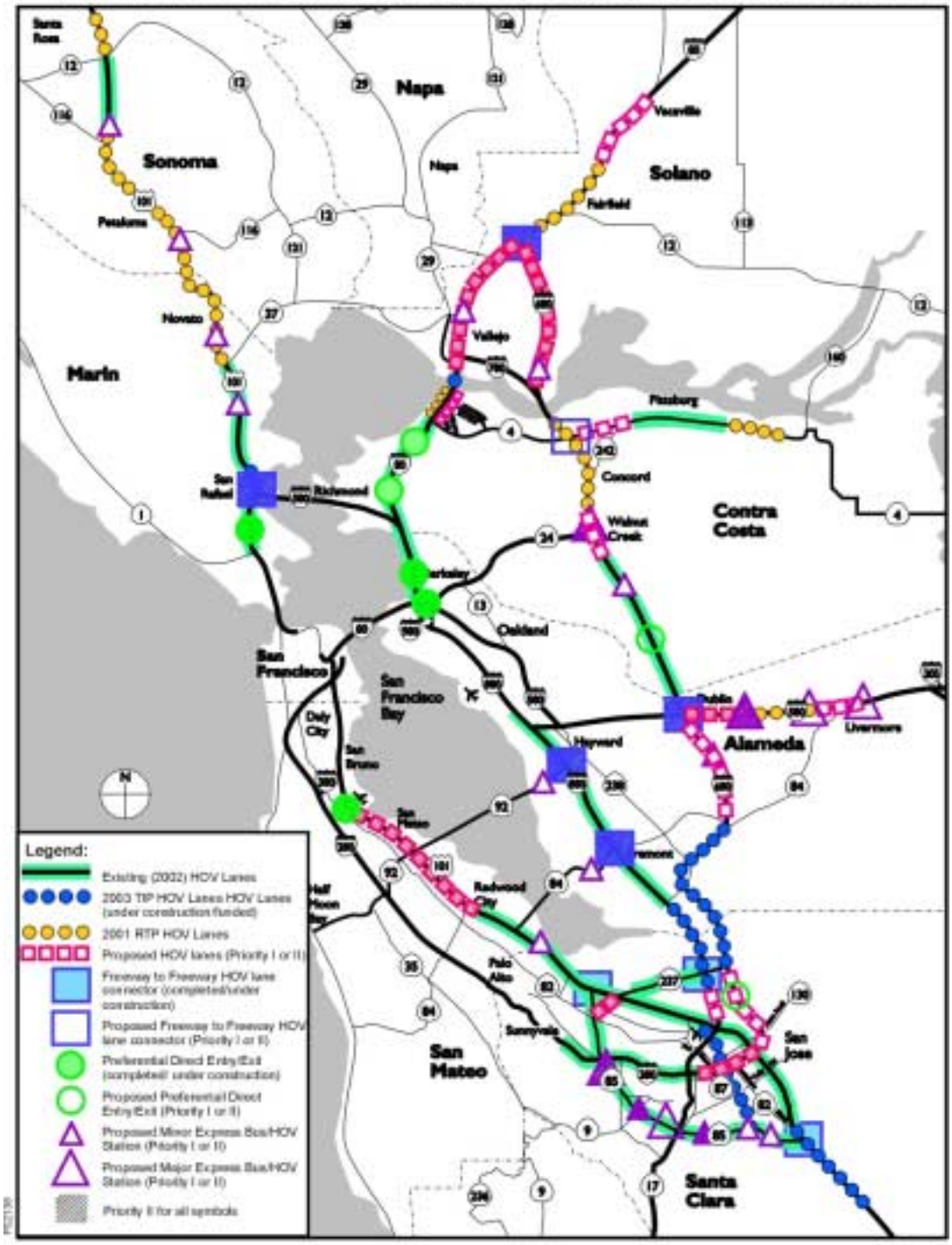
SH:DK

Priority 1 Recommended HOV Lane System Improvements



DKS Associates

Priority 1 & 2 Recommended HOV Lane System Improvements



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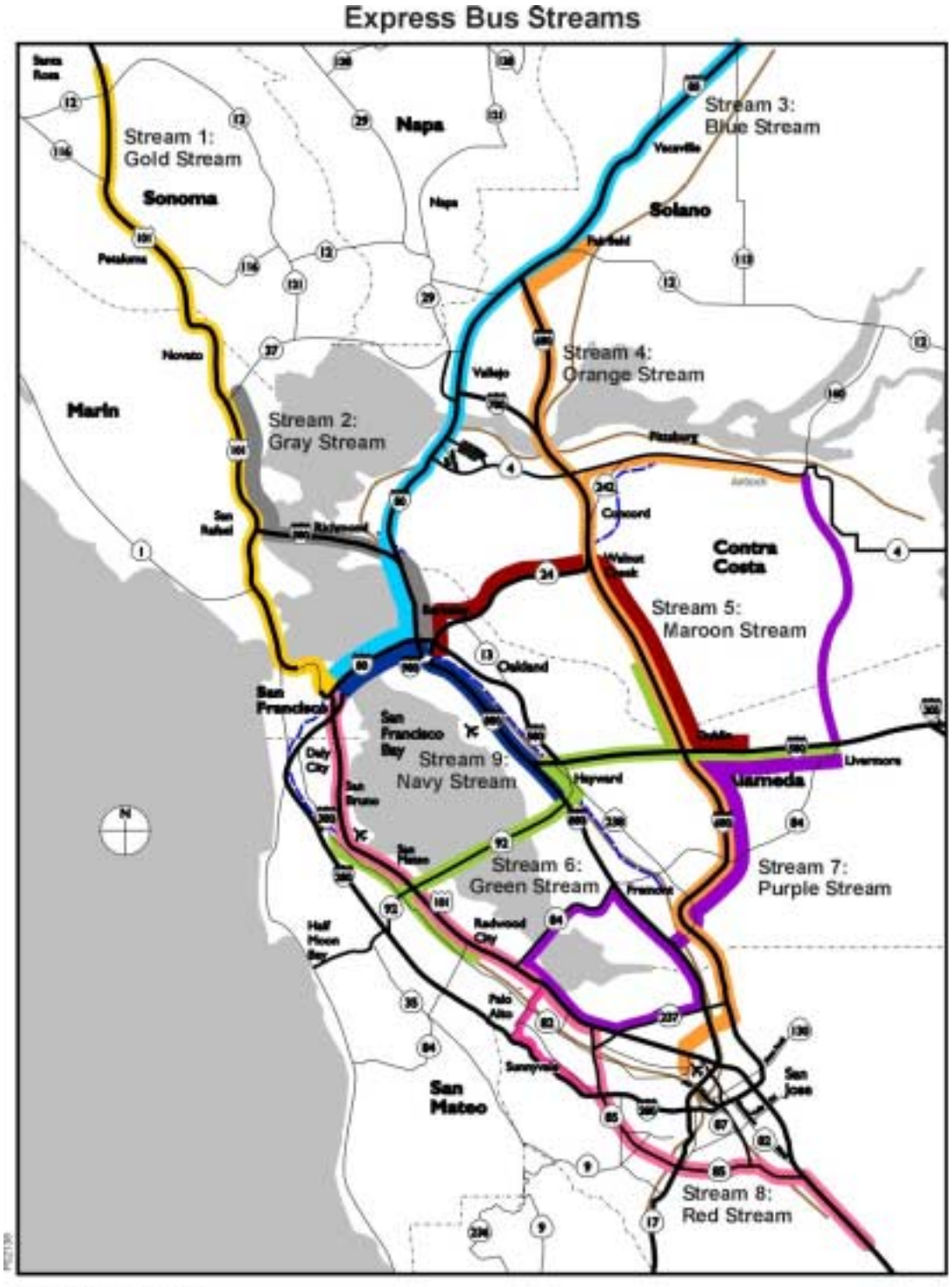
Express Bus Streams
Stream 1:
Gold Stream
Stream 2:
Gray Stream
Stream 3:
Blue Stream
Stream 4:
Orange Stream
Stream 5:
Maroon Stream
Stream 6:
Green Stream
Stream 7:
Purple Stream
Stream 8:
Red Stream
Stream 9:
Navy Stream
Sonoma
Marin
Napa
Solano
Contra
Costa
Alameda
San
Francisco
San
Mateo
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